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PATENT SPECIFICATION

Complete Specification Lodged ..... 17th January, 1956.

Application Lodged(No.15,246/56) ..... 17th January, 1956.

Applicant..... Armstrong Patents Co., Limited.

Actual Inventor..... Ronald Sidney Dickinson.

Convention Application.

(England, 19th January, 1955).

Complete Specification Published ..... 19th July, 1956.

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Classification 96.5.

Drawing attached.

COMPLETE SPECIFICATION.

"IMPROVEMENTS IN AND RELATING TO TELESCOPIC HYDRAULIC SHOCK ABSORBERS".

The following statement is a full description of this invention, including the best method of performing it known to us:-

This invention relates to telescopic hydraulic shock absorbers.

This type of shock absorber normally comprises a piston displaceable within a pressure cylinder which is surrounded by an outer reservoir, valve means being provided to permit circulation of fluid within the shock absorber on relative displacement of the piston and cylinder. While this type of shock absorber is satisfactory for many purposes, the need arises in some instances for a shock absorber allowing greater damping than is normally obtainable with a shock absorber of the type described above.

An object of the invention is to provide a shock absorber having improved damping qualities.

According to the present invention, an improved telescopic hydraulic shock absorber comprises a first piston dis-

placeable within a first cylinder, a second piston displaceable within a second cylinder in series with and fixed with respect to the first cylinder, and a common reservoir surrounding the first and second cylinders.

In a preferred form of the invention, the first and second cylinders are supported in a junction member which also supports a first outer tube concentric with the first cylinder and a second outer tube concentric with the second cylinder, a passage being located in the junction member to permit flow of fluid between the space enclosed between the first cylinder and the first outer tube and the space enclosed between the second cylinder and second outer tube. The two spaces and connecting passage together constitute the common reservoir.

Each of the cylinders may be secured to a foot valve casting which in turn is secured to the junction member.

The invention will now be further described with reference to the accompanying drawings in which:-

Fig. 1 illustrates the upper part of a telescopic hydraulic shock absorber according to the invention, and,

Fig. 2 illustrates the lower part of a telescopic hydraulic shock absorber according to the invention, the cut-away line A-A being common to both Figures.

In the drawings, in which like numbers refer to like parts, a junction member 3 has a series of ports 3a located therein to permit flow of fluid through the junction member. A foot valve casting 4 is secured to the junction member on each side of the line A-A. A valve plate 5 is mounted so as to be slidable against opposing spring pressure on a spindle 6 centrally mounted in the foot valve casting 4. Each foot valve casting 4 supports one end of a pressure cylinder 7 and the junction member 3 supports an outer tube 8 on each side of the line A-A. The passage-ways 3a in the junction member 3 provide communication between the annular spaces defined between the pressure cylinder 7 and the outer tube 8 on each side of the line A-A, and the annular spaces and passage-ways constitute a common reservoir. Passages 4a located in each of foot valve casting 4 provide communication between the space within each pressure cylinder 7 and the passages 3a of junction member 3.

In each of Figs. 1 and 2 a piston 9 displaceably positioned within pressure cylinder 7 is mounted upon a piston rod 10 slidable within a bore 11a in a cylinder head 11 which closes the ends of cylinder 7 and tube 8 remote from the junction member 3. Piston 9 is provided with passages 9a to permit communication between those parts of the interior of tube 7 on opposite sides of the piston 9 and a non-return valve 12 is located within passages 9a to control flow of fluid therethrough.

A passage 11b in the cylinder head extends between

the axial bore 11a and a drain tube 13 terminating adjacent a baffle 14 positioned to minimise frothing of fluid and fluid surge within the reservoir.

The end of the interior of the pressure cylinder 7 remote from the casting 4 communicates via apertures 7a, an annular passage 11c and a bore 11d with one end of a dependent liquid discharge pipe 15, the lower end of which is closed by a non-return valve 16.

The end of the piston rod 10 remote from the piston 9 is bolted to a bracket 17 which is intended to be secured to one part of the vehicle in which the shock absorber is mounted. A coil spring 18 extends between the bracket 17 and an outstanding flange 19 secured to the outer surface of the outer tube 8.

It will be appreciated that the assemblies of Figs. 1 and 2 function in substantially the same manner. On displacement of piston 9 relative to pressure cylinder 7, fluid passes from pressure cylinder 7 via the discharge pipe 15, unseats the valve 16, flows through passages 3a and 4a, unseats valve plate 5 and flows through passage 9a of piston 9 by unseating valve 12.

Pistons 9 may be displaced simultaneously relative to their respective cylinders 7; which are fixedly connected together via the junction member 3.

Thus, the shock absorber according to the invention gives improved damping by virtue of the fact that in operation, relative displacement occurs between three members, namely each of the two pistons, and a third member consisting of the components attached to the junction member, instead of the normal relative displacement between two components, namely a piston and a cylinder. Furthermore, it will be appreciated that the provision of a common reservoir for the two pistons and their respective cylinders provides a construction which is not only more economical in production, but which is also more convenient in use than two separate telescopic hydraulic shock absorbers of the onventional type arranged in series.

The claims defining the invention are as follows:-

1. A telescopic hydraulic shock absorber comprising a first piston displaceable within a first cylinder, a second piston displaceable within a second cylinder in series with and fixed with respect to the first cylinder, and a common reservoir surrounding the first and second cylinders. (19th January, 1955).

2. A telescopic hydraulic shock absorber as claimed in claim 1 in which the first and second cylinders are supported in a junction member which also supports a first outer

tube concentric with the first cylinder and a second outer tube concentric with the second cylinder, a passage being located in the junction member to permit flow of fluid between the space enclosed between the first cylinder and first outer tube and the space enclosed between the second cylinder and second outer tube. (19th January, 1955).

3. A telescopic hydraulic shock absorber as claimed in claim 2 in which each of the cylinders is secured to a foot valve casting which in turn is secured to the junction member. (19th January, 1955).

4. A telescopic hydraulic shock absorber substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings. (19th January, 1955).

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Serial No.	Application No.	Classification.
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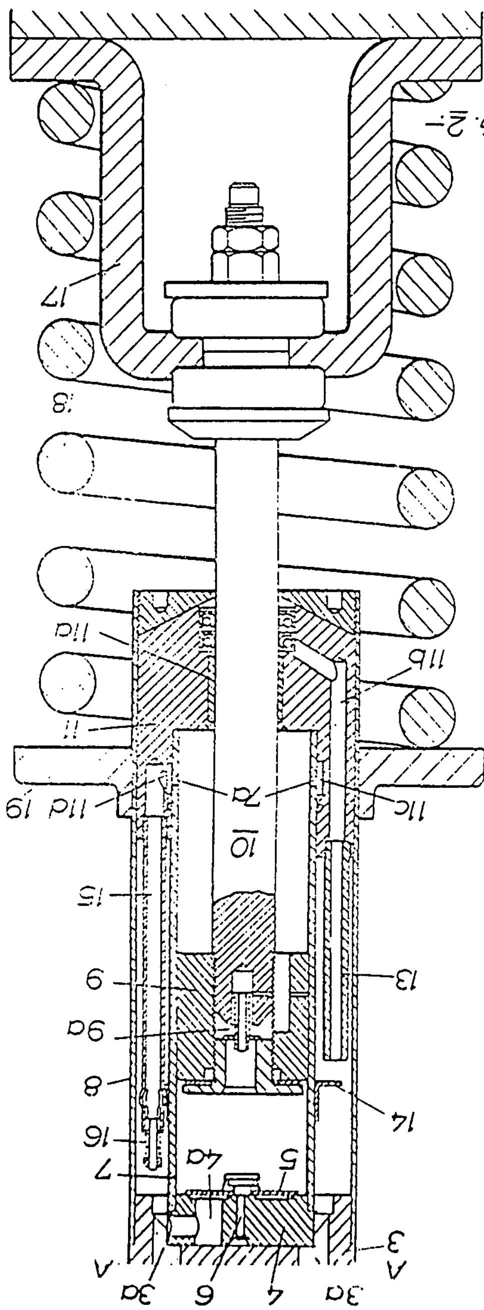

FIG. 2

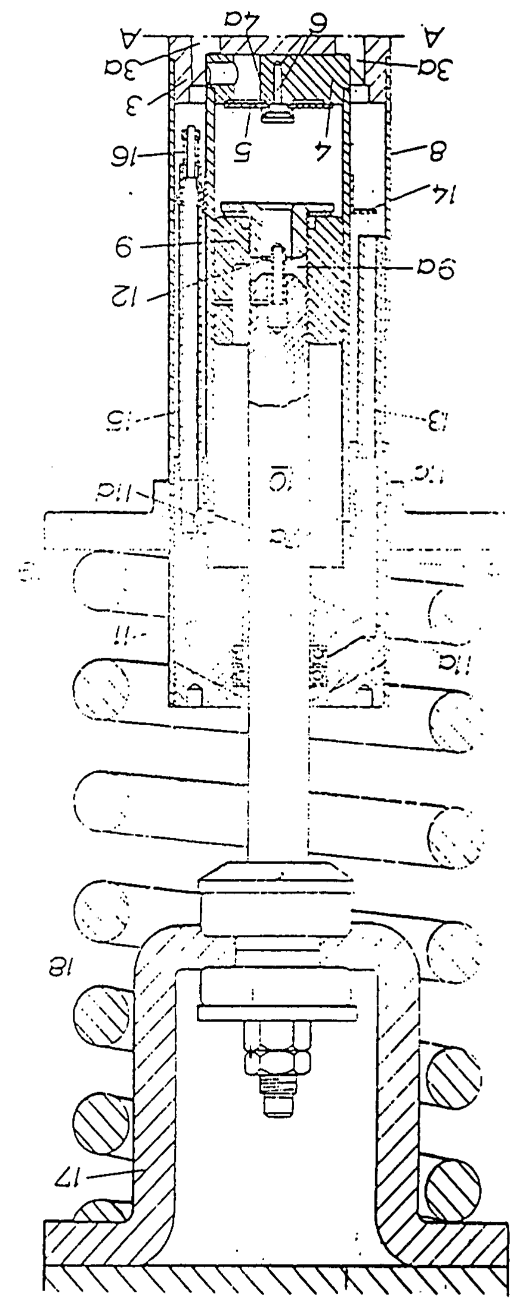

FIG. 1